

# Transformation, War and Training Technology

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# Current and Future Challenges

- Complex Missions (Joint Urban Operations, Joint Close Air Support)
- Complex Organizations (Joint Task Forces, Coalitions)
- New Methods of War (Information Attack/Denial, Robotics, Sensor to Shooter)
- Asymmetric Threats
- Proliferation of Commercial Off-the-Shelf Tech
- Complex Weapons Systems and Ammunition
- OPTEMPO
- Lack of Spectrum and Space
- Rapid Technological and Social Change



# Proof of Training Transformation Since 1991: OIF 2003

- All armored forces trained on CATT prior to deployment (24/7 operation)
- All field artillery soldiers trained on FSCATT
- All maneuver units had trained at NTC
- All light forces (including Special Ops) trained at Joint Readiness Training Center
- Training with MILES, Mobile MOUT, and Engagement Skills Trainer in theater
- All major operations wargamed from BN to Theater level

# Some Technology Themes

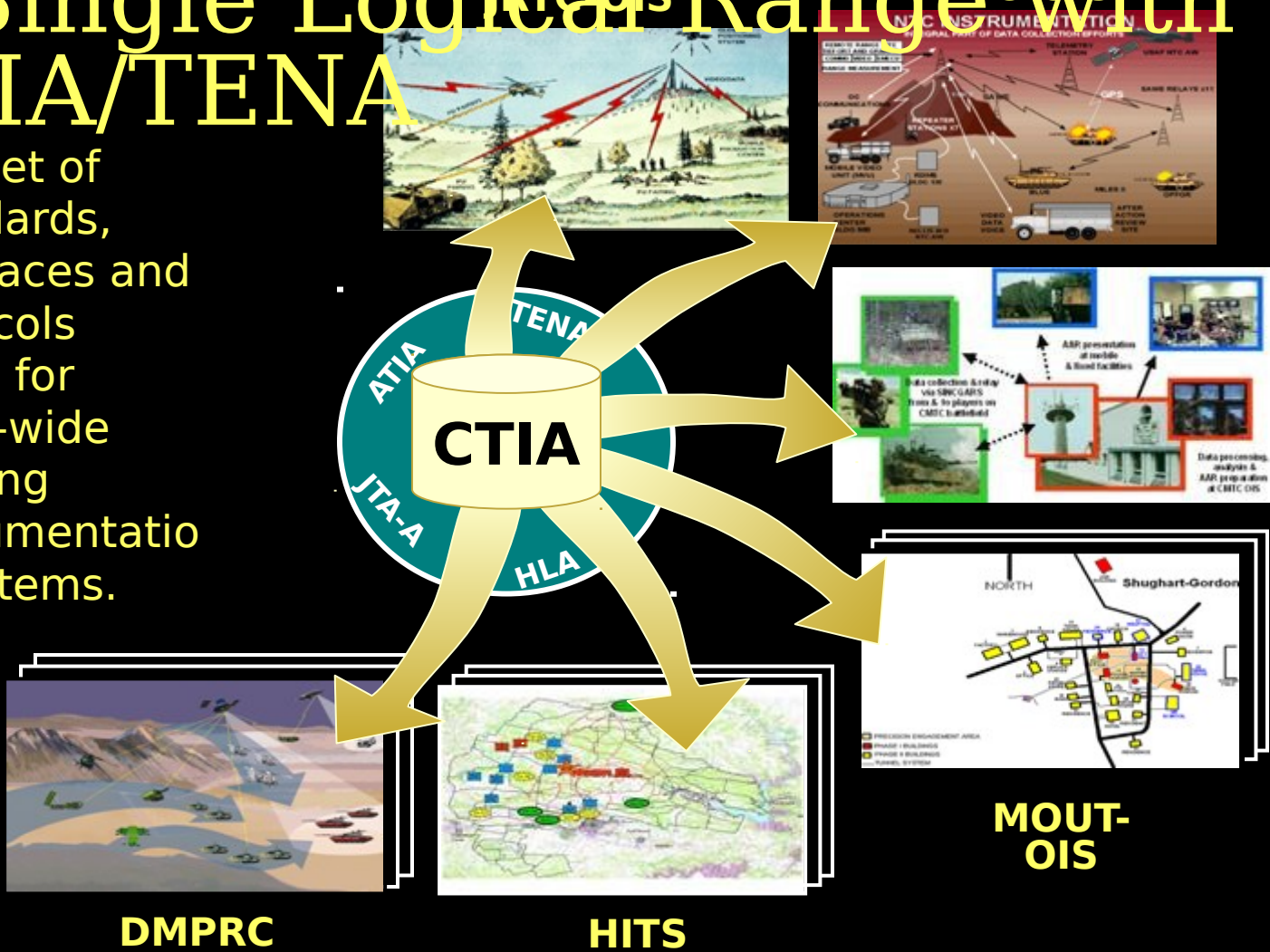
- OneSAF, OneTESS, CTIA in potential new applications (e.g. OneSAF with game-like front-ends)
- Exploitation of commercial Graphics Processing Units (GPU's) for non-graphics applications
- Smaller, cheaper, better
  - Low-power microprocessors (e.g. ARM)
  - Ubiquitous wireless (802.11)
  - Embedded GPS
  - Solid state storage (e.g. GB Flash)
- Real-time simulation database generation
- Exploitation of commercial entertainment technology for rapid TTP development and training

# We Have Been Exploiting Commercial Technology

- Primarily Intel/AMD -- based sim platforms (e.g. AVCATT, CCTT, ACTF, OneSAF)
- Converting to all PC Graphics (CCTT, AVCATT, EST 2000, COFT upgrade)
- First Console Application – Full Spectrum Warrior from ICT and Pandemic Studios (published by THQ)
  - Number 1 Xbox game on Amazon
- Computer Games -- OneSAF and There, Inc Massive Multiplayer Game environment
  - In alpha testing with National Guard
- Commercial languages, development tools, and API's -- Java, C++, XML, OpenGL, DirectX
- Commercial and Open-source – Linux, Windows XP

# Biological Range with

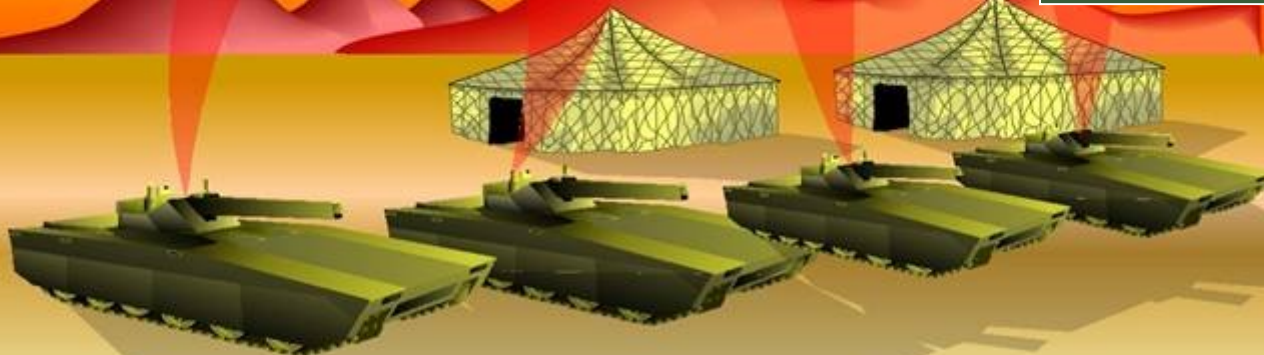
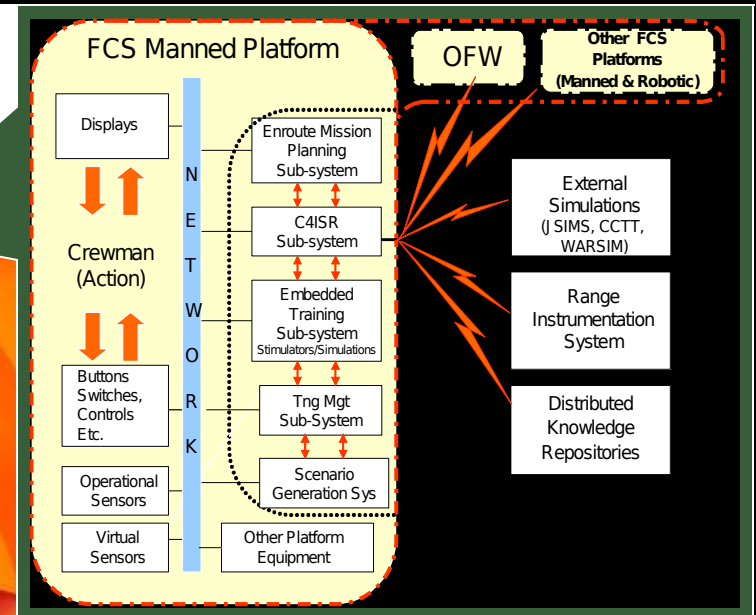
# The Set of Standards, Interfaces and Protocols (SIPs) for Army-wide Training Instrumentation Systems.



**CMTC-  
OIS**

# MOUT-OIS

# Live, Virtual and Collective Simulation and Mission Rehearsal for the Unit of Action with OneSAF



# OneSAF Embedded Simulation within C2 Systems



# Real-time Computational Challenges for Computer Generated Forces (CGF)

Need to provide interactive, real-time terrain reasoning for Computer Generated Forces given:

- Extremely dense terrain databases (e.g. Baku, NYC, Baghdad)
- Thousand of simulated entities (size of Army Unit of Action)
- Simulation of long-range and novel sensors
- Must fit on Future Combat System platforms (no Beowulf clusters allowed)



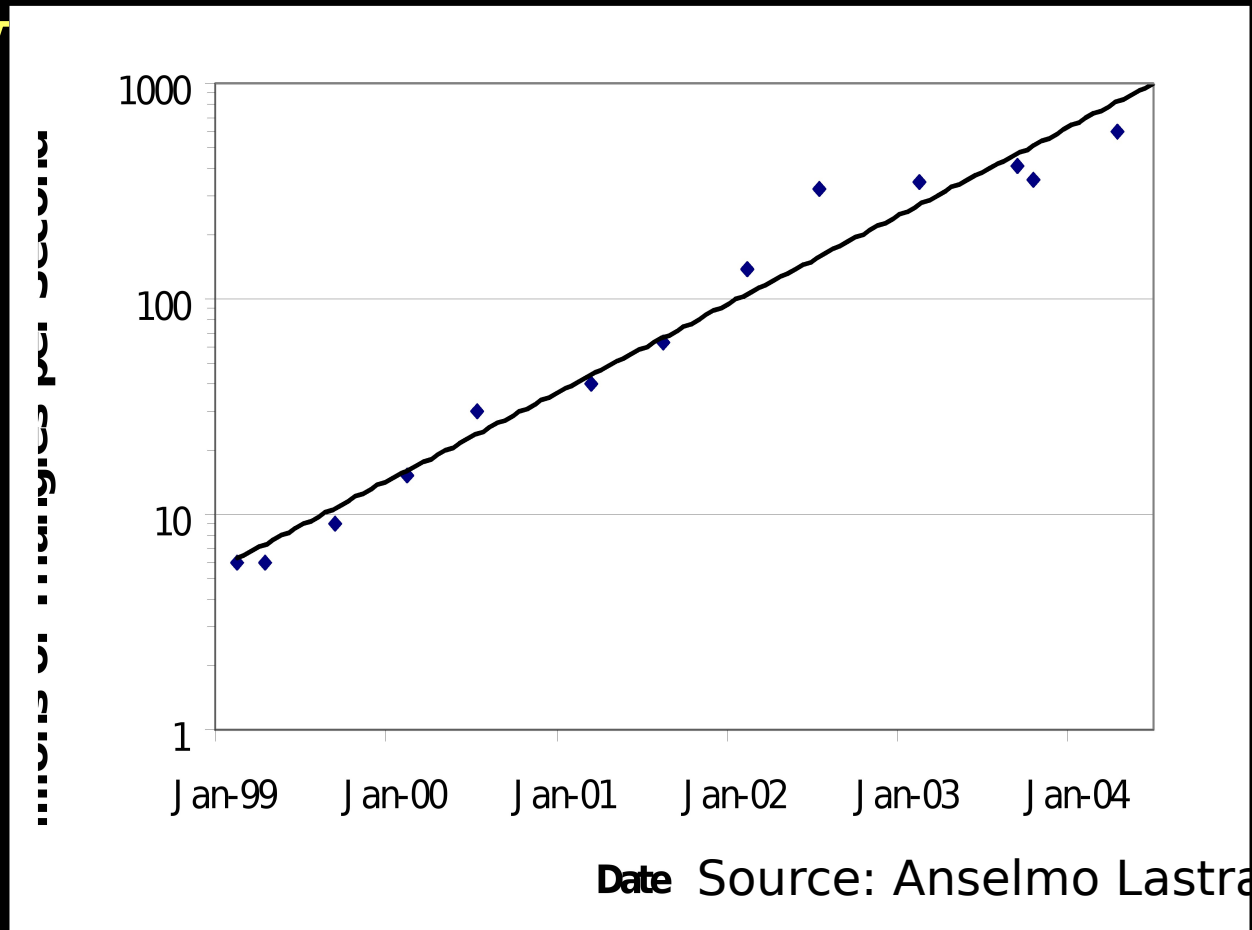
Bottomline: Traditional CPU architecture and Moore's law are not enough to achieve capability in this decade.

# Real-time Terrain Algorithms for Computer

- **Generated Forces** Best algorithms are  $O(N^2)$  where  $N$  = objects/entities in the CGF database (e.g., sensors, platforms, buildings, people)
- 40% to 80% of CGF CPU time is required for battalion-level scenarios spent in sensing functions:
  - Collision detection
  - Line of sight computation

# Why GPU/Streaming ?

## Because performance is moving faster than Moore's Law



# Full Spectrum Command: PC Game from Quicksilver/ICT Teaching Infantry Officers

1. Situation

2. Mission

3. Execution

4. Service Support

5. Command & Signal

a. Task Org

b. Intel

c. Fire Support

d. ROE

e. Engineer

f. ADA

SITUATION:

1. SITUATION:  
SPF forces loyal to General Marlenc have been operating in the central Kazar region near the McKenna village complex. These forces have been targeting UN peacekeepers and have been involved in several small skirmishes resulting in casualties. The intent of the SPF is to try and discredit the UN forces to the local population and bring international attention to the ethnic suffering of Gordians in the central Kazar region. In the latest conflict between the SPF and Kazar troops General Marlenc was seriously wounded. He was seen by UN UAV film footage to be being loaded into a vehicle and sent to the McKenna village complex. McKenna is a historical Gordian stronghold; recently all civilians have abandoned the McKenna region due to the conflict between the SPF and UN forces. Marlenc is believed to be moving to McKenna so he can receive treatment at the local infirmary. Since General Marlenc is seriously wounded the opportunity to capture or neutralize him available. His wounds will require that he stay stationary for at least the next 48 hours.

A. Enemy Forces:  
1. Composition: General Marlenc is known to always travel with personal bodyguard and a rifle squad of six SPF soldiers. This squad is personally selected by Marlenc and should be considered elite (they will have the best weapons currently available to the SPF). Past pattern analysis indicates that General Marlenc will also have a second squad available to secure any

BATTALION OPORD

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DEPLOY

CHANGE VIEW



MAP TOOLS:

SCROLL THROUGH MAPS:

Warrior Radio

Maneuver Element Radios

OPORD

TASK

ORDERS



GC

# Full Spectrum Warrior: Game Consoles for Squad Leaders



**Best Original Game and Best Simulation at E3.**

**"A dark horse, a sleeper hit, a hidden gem. But we will settle for saying that this military simulation game was the best original title at E3."**

**"Apart from Full Spectrum Warrior's amazing visual and aural presentation, the two standout elements in the game are its context sensitive AI (which in this case could stand for "Actually Intelligent") and its revolutionary user interface."**



# Massive Multiplayer Environments

- Collaborative environment with over 100,000 participants
- Project at STTC
- Social organization



# Anywhere



U.S. Army Ssgt. Brad Carpenter of Opelika, Al., from the 4th Infantry Division surfs the Web at a newly opened internet cafe in Tikrit, about 110 miles (180 kilometers) northwest of Baghdad, Iraq



Email queue in Afghanistan



# Wrap-up

- Growing need for new training technology
- Solutions to support GWOT
- Commercial world offers new opportunities
- Applications to Homeland Security
- Work with us to find the warfighter with a need